



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of : Docket No. 0805774-0004  
Mark Alistair POLETTI : Art Unit 2643  
Application No. 09/197,096 : Examiner LAO, LUN S  
Filed: November 20, 1998 :  
For: An Improved Guitar Preamplifier System With Controllable Distortion

DECLARATION

I, COLIN FOX, declare:

1. I am the Colin Fox who has previously made a declaration dated 15 November 2004 in relation to the above.
2. I have been requested to review US patent 4589135 the Baker patent and have done so in detail and carefully.
3. The section of Baker, namely col 6 line 57 to col 7 line 36, specifically referred to by the examiner does not disclose equi-phase filters. In fact Baker describes implementation of filters that are very different, and intentionally different, to equi-phase filters.
4. The phase response of the individual Baker filters is explicitly shown in Baker Fig. 5 for Baker's preferred embodiment in Baker Fig. 1, table in col. 8, as stated in Baker col.10 line 1 to 7. As can be seen in Baker Fig. 5, the phase of the output of the high- and low-pass filters are significantly different *at all frequencies* shown.
5. In particular: at low frequencies the low-pass filter has output phase close to -5 degrees while the high-pass filter has output phase 150-175 degrees, at the crossover frequency near 1100 Hz the low-pass filter has output phase close to -75 degrees while the high-pass filter has output phase close to 50 degrees, and at high frequencies near 10,000 Hz the low-pass filter has output phase about -150 degrees while the high-pass filter has output phase close to 0 degrees.

6. Quite clearly therefore, the Baker filters do not meet the Poletti equi-phase requirement that the filters have a response "whereby any phase shift to substantially any frequency past in more than one of said frequency bands is substantially the same".
7. Further, the property that Baker's individual filters have substantially different phase response at many frequencies is inherent in the invention described in Baker, and is not just a feature of Baker's preferred embodiment cited above. This inherent property can be seen as follows. Baker develops his invention using two filter banks to separate frequencies above and below the crossover frequency (cf. Baker Fig. 1, Fig. 7, Eqns 1 & 2, etc.). In the following I refer to the outputs, or equivalently the transfer function, at each frequency of low-pass filter and high-pass filter as lp and hp, respectively. Baker clearly states the novel aspect of his invention in col. 1 line 1 to 7 to 15, col. 2 line 2, and again in col. 4 line 21 to 34 that

$$lp + hp = 1.0$$

or in terms of magnitude and phase of the complex number

$$\text{magnitude}(lp + hp) = 1, (\text{eqn1})$$

$$\text{phase}(lp + hp) = 0, (\text{eqn2})$$

The latter relationship is the origin of Baker's claim to "zero phase shift filtering". Note that, as Baker states (col. 1 line 13 to 15, col. 3 line 20, col. 7 line 22, etc.) that the zero phase shift holds for the single *combined* output of filters, and does not claim this for the output of individual filters, as apparently implied by the examiner. A direct implication of (eqn1) and (eqn2) is that at frequencies where

$$\text{magnitude}(lp) = \text{magnitude}(hp)$$

the phase responses must satisfy

$$\text{phase}(lp) = -\text{phase}(hp).$$

For any filter with non-zero phase response at crossover frequency, this implies that the phase responses are the negative of each other, and not equal.

8. Poletti employs equi-phase filters with a particular embodiment being the (existing) Linkwitz-Riley filter design. These filters are characterized by the design equations
- $$\text{magnitude}(lp + hp) = 1, (\text{eqn3})$$
- $$\text{phase}(lp) = \text{phase}(hp). (\text{eqn4})$$
- The latter relationship is the origin of the term "equi-phase". Note that (eqn2) and (eqn4) differ. Equi-phase filters are very different to the filters described in Baker.

9. I note that Poletti acknowledges the Linkwitz-Riley filters as prior art, referring to the 1976 JAES article by S. H. Linkwitz. I do not see in Poletti a claim to invention of equi-phase filters, nor the Linkwitz-Riley embodiment. Rather, Poletti uses them as building blocks in his novel guitar preamplifier. Poletti's *usage* of the equi-phase filters in combination with nonlinear elements to produce a novel guitar preamplifier is genuinely novel and is the essence of Poletti as I understand it. The citing of Baker is specious as Baker is not an example of equi-phase filtering.
10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this Application for Patent or any patent issuing thereon.

DECLARED at  
Auckland, New Zealand  
this 17<sup>th</sup> day of October 2005

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COLIN FOX